

REMARKS

Claims 1-9 are pending in the application and stand rejected. Claim 1 has been amended. Claims 10-15 have been added. Reconsideration of Claims 1-9 and allowance of Claims 1-15 in view of the above amendments and following remarks is respectfully requested.

The Rejection of Claim 1 Under 35 U.S.C. § 102/103

Claim 1 stands rejected under 35 U.S.C. § 102 as anticipated by, or in the alternative, under 35 U.S.C. § 103 as unpatentable over the Singh reference. Applicants respectfully request withdrawal of the rejection for the following reasons.

Claim 1 has been amended to recite that the bleached pulp product of the method has a brightness of at least 60%. Descriptive support for this recitation can be found in the specification as originally filed, for example, Example 6.

The Examiner states that the Singh reference teaches kraft pulping of *Arundo donax* and then bleaching the resulting pulp with oxygen. Applicants believe that the Singh reference describes a one-stage oxygen-caustic soda treatment that is, in fact, not a bleaching step, but rather a delignification step. The reference compares the one-stage oxygen-caustic soda treatment to a conventional two-stage treatment of chlorination and caustic soda extraction in Table III. To further support applicants' position that the one-stage oxygen-caustic soda treatment is a delignification stage and not a bleaching stage, applicants note that the reference states that "oxygen treatment lowered lignin content to 1.49 per cent from an initial value of 4.17 per cent as compared to 2.6 per cent for the chlorination extraction treatment". The reference itself makes clear that the step is a delignification stage and not a bleaching stage. Referring to Table III, while the lignin content reduction is prominently noted, the table provides no brightness data. This further supports applicants' position that the one-stage oxygen-caustic soda treatment is a delignification stage and not a bleaching stage.

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Most importantly, after describing the one-stage oxygen treatment and conventional two-stage treatments, the reference then describes "full bleaching" by a normal five-stage sequence and a special three-stage sequence, which use the same conditions for the first stages as described in Table III (i.e., one-stage oxygen-caustic soda treatment for one and conventional two-stage treatment of chlorination and caustic soda extraction for the other). Applicants believe that such a statement makes clear that the one-stage oxygen-caustic soda treatment is not a bleaching stage. The results comparing "full bleaching" by the normal five-stage sequence and the special three-stage sequence are provided in Table IV of the reference. In contrast to Table II, which applicants believe provide the results of the delignification stage, the "full bleaching" results presented in Table IV provide brightness results, which is the accepted measure of any bleaching stage.

Applicants respectfully request that the Examiner reconsider his interpretation of the teachings of the Singh reference in view of the foregoing remarks.

As noted above, Claim 1 has been amended. Claim 1 has been amended to recite that the bleaching process provides a bleached pulp having a brightness of at least about 60%. Applicants submit that the Singh reference fails to describe a total chlorine free bleaching process that provides an Arundo donax pulp having a brightness of at least about 60%. Although the Singh reference appears to describe Arundo donax pulp having a brightness of at least 60% (see Table IV, reported brightness values of 87.8 and 86), these brightness values are for pulp that has been bleached by processes that include chlorine agents, and are not, therefore, chlorine-free processes.

Applicants submit that the brightness of pulp produced from oxygen delignification (or the single-step oxygen treatment as described by the Singh reference) will not achieve the brightness recited in Claim 1.

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Applicants enclose herewith copies of pages 159, 160, and 170-174 from R.P. Singh, et al., "Oxygen Bleaching," *The Bleaching of Pulp*, 3d ed., TAPPI Press, Atlanta, Georgia, 1979. At page 159, the reference notes that oxygen bleaching of pulps can lead to significant deterioration of the pulp and that such pulps can have a brightness at a level of 30-40 GOST units. At the bottom of page 159, the reference states "[i]f the treatment was so substantial that the brightness increased to more than 50 units, the viscosity and strength properties of the pulp deteriorated noticeably".

Pages 171-174 of the reference relate to brightness increase in the oxygen stage. The reference notes that when lignin is removed from the pulp in oxygen bleaching, the brightness increases. At page 171, the reference states:

At a normal level of a "bleachable" degree pulp (Kappa 17-18), the brightness is about 38% SCAN, and further bleaching to Kappa no. 13 gives 45% SCAN. In order to achieve the semibleached range (60+% SCAN), the pulp must evidently be delignified to Kappa numbers below 7.

At page 174, Figure 7.10 of the reference shows "a very uniform relationship between lignin content and brightness". Figure 7.10 shows that brightness values approaching 60% SCAN are attainable only for pulps having Kappa numbers less than about 7. Because a Kappa number of about 7 corresponds to a lignin content of about 1.0 percent ($\text{lignin percent} = 0.147 \times \text{Kappa}$), the reference teaches that pulp having a brightness approaching 60 has a lignin content of about 1.0.

The Singh reference cited by the Examiner describes a one-stage oxygen-caustic soda treated *Arundo donax* pulp having a lignin content of 1.49 percent (see Table III), which corresponds to a Kappa number of 10.1. According to the relationship between brightness and Kappa number set forth in Figure 7.10 of the Singh reference noted above, a Kappa number of 10.1 means that the pulp would have a brightness of about 52%. This is in contrast to the

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method of the claimed invention, which provides a pulp having a brightness of at least about 60%.

The cited reference fails to exactly describe the invention as now claimed. Because the cited reference fails to teach, suggest, provide any motivation to make, or otherwise render obvious the invention as now claimed, applicants submit that the claimed invention is nonobvious and patentable over the cited reference. Withdrawal of these rejections is respectfully requested.

The Rejection of Claims 1-9 Under 35 U.S.C. § 103

Claim 1-9 stand rejected under 35 U.S.C. § 103 as unpatentable over the Singh reference or WO 99/66119 in view of Canadian Patent Application No. 2,132,056 ("the '056 application"), with or without WO 96/09434. Applicants respectfully request withdrawal of the rejection for the following reasons.

As noted above, Claim 1 has been amended to recite that the bleached pulp product of the method has a brightness of at least about 60%.

The Singh reference describes a one-stage oxygen-caustic soda treatment for Arundo donax kraft pulp. As noted above, the Singh reference does not teach or suggest an Arundo donax pulp having a brightness of at least about 60% produced by a chlorine-free bleaching process. Likewise, WO 99/66119 fails to describe chlorine-free bleaching of Arundo donax kraft pulp. The '056 application describes bleaching wood pulp using at least one of oxygen, ozone, chlorine dioxide, or hydrogen peroxide. WO 96/09434 describes bleaching wood pulp using at least two of the following bleaching chemicals: oxygen, ozone, or hydrogen peroxide.

The deficiencies of the teachings of the Singh reference and WO 99/66119 are not cured by the teachings of the '056 application, with or without WO 96/09434. Neither the Singh reference nor WO 99/66119 teach or suggest a total chlorine free process for producing Arundo

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donax pulp. Each reference describes Arundo donax pulp having brightness sufficient for commercial purposes. The '056 application and WO 96/09434 relate only to processing woods. These references fail to teach, suggest, or provide any motivation to pulp and/or bleach any non-wood, and certainly not Arundo donax. The teachings of the '056 application, with or without WO 96/09434, simply fail to fill the void of the teachings of the Singh reference or WO 99/66119 noted above.

Because the cited references, either alone or in any combination, fail to teach, suggest, provide any motivation to make, or otherwise render obvious the invention as now claimed, applicants submit that the claimed invention is nonobvious and patentable over the cited references. Withdrawal of the rejection is respectfully requested.

New Claims 10-15

Claims 10-15 have been added.

Claims 10 and 11. Claims 10 and 11 depend from Claim 1 and recite brightness values of at least 70% and at least 85%, respectively. Descriptive support for these recitations can be found in the specification as originally filed, for example, Example 6.

Claims 12-15. Claim 12 corresponds to original Claim 1, but further recites that the pulping process comprises cooking the furnish using an H-factor of about 850. Descriptive support for this recitation can be found in the specification as originally filed, for example, Example 4. Claims 13-15 depend from Claim 12 and recite brightness values of at least 60%, at least 70%, and at least 85%, respectively. Descriptive support for these recitations can be found in the specification as originally filed, for example, Example 6.

Conclusion

In view of the above amendments and foregoing remarks, applicants believe that Claims 1-15 are in condition for allowance. If any issues remain that may be expeditiously

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addressed in a telephone interview, the Examiner is encouraged to telephone applicants' attorney at 206.695.1755.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE FEBRUARY 3, 2003

In the Claims:

1. (Amended) A method for forming bleached [an] Arundo donax pulp, comprising:

(a) subjecting a furnish comprising Arundo donax particles to a pulping process to provide Arundo donax pulp; and

(b) bleaching the Arundo donax pulp by a total chlorine free process to provide a bleached pulp, wherein bleached pulp has a brightness of at least about 60%.

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